VIRGINIA'S TRIBUTARY STRATEGIES

A customized approach to reduce nutrient pollution in the rivers flowing into the Chesapeake Bay

Revising Virginia's Chesapeake Bay Tributary Strategies

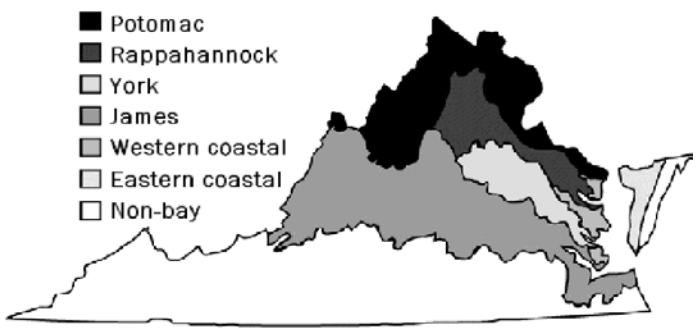
The York River

Introduction

Since the early 1990s, Virginia has worked to develop and implement water quality plans, tributary nutrient reduction strategies, for each main tributary river of the Chesapeake Bay. These strategies have their beginnings in the Chesapeake Bay Program and the scientific research that identified excess nutrients, primarily nitrogen and phosphorus, and sediments as the greatest water quality problems faced by Chesapeake Bay and its tributaries.

Virginia's tributary strategies are based on a cooperative, voluntary approach to restoring water quality. In developing these strategies, Virginia's natural resources agencies work closely with local governments, farmers, conservation groups, wastewater treatment plant operators, community groups and others who have an important stake in ensuring clean water in Virginia's communities. This locally based approach helped the commonwealth and its citizens craft tributary strategies with effective solutions rooted in practical methods.

Virginia's Bay Watersheds



York River Watershed Fast Facts

- *Drainage Area in Acres: 1,707,841*
- *Square Miles: 2,668.5*
- *6.24 percent of Virginia's land base*
- *Length of York River: 36 miles. This is the length of the York River proper, from West Point (confluence of Mattaponi and Pamunkey rivers) to the mouth. The length of the watershed is about 200 miles, from the headwaters of the North Anna River and Pamunkey Creek to the mouth.*
- *Counties: 17*
- *Towns: Ashland, Hanover, West Point, Gloucester, Gloucester Point, Yorktown*
- *2000 Population: 263,633*
- *Headwaters: North Anna River and Pamunkey Creek*
- *Larger Tributaries: Mattaponi, Pamunkey, North Anna, South Anna rivers*

Today Virginia and her bay state partners face a new and daunting chapter in restoring water quality that will sustain living resources and aquatic habitats in the bay and its tidal tributaries. Changing water quality conditions have led the Chesapeake Bay partners to develop new nutrient and sediment reduction goals. An ambitious timetable adopted in the new Chesapeake Bay Agreement, *Chesapeake 2000*, calls for removing the Bay and its tidal tributaries from the federal list of impaired waters by 2010. With these new goals in hand Virginia is now embarking on a process with local stakeholders to revise existing tributary strategies. Natural resource agency staff will work with stakeholders in each basin seeking common agreement on what needs to be done and how best to do it.

Focus on nutrients and sediments

Nutrient enrichment is a surplus of phosphorus and nitrogen that runs off land, settles from the air, or is discharged from industrial or municipal sources. It's one of the bay system's key pollution problems.

Another is sediment, coming mainly from erosion that can smother aquatic plants and animals.

The rivers and the bay support various valuable living resources such as oysters, fish, crabs, waterfowl and many kinds of underwater plants. This aquatic life needs dissolved oxygen to survive. But excess nitrogen and phosphorus over-fertilize bay waters causing an abundance of algae that prevent sunlight from reaching underwater plants. When the algae die, the decay process robs the water of oxygen.

Nutrients occur naturally and would flow into bay waters even if people were not living around its shores. But excess amounts of nutrients come from sewage treatment plants, some industries, agricultural and lawn fertilizers, and a variety of other sources.

There are two main pathways nitrogen and phosphorus take to enter the bay and its rivers. One is *point source pollution,* which occurs primarily when sewage treatment plants and industrial facilities discharge treated wastewater into a river or stream. The other is *nonpoint source pollution,* most of which is runoff from farm and pasture land, and from development in urban and suburban areas.

For point sources, Biological Nutrient Removal (BNR) technology is one key to success. BNR can eliminate between 60 and 85 percent of the nutrients that treatment plants discharge.

For nonpoint source pollution, best management practices (BMPs) are the key to reducing nutrient levels. Farmers, in particular, can and do reduce nonpoint source pollution by conscientiously managing agricultural land. The core of the nonpoint portion of any tributary strategy is the continuation of current programs and activities, such as farm plan implementation, conservation tillage, nutrient management, and management of animal wastes and highly erodible lands, plus greater focus on lawn care by homeowners. Stormwater management also is key to eventual success in nutrient and sediment reductions.

The York River Watershed

The York River drainage basin is 2,669 square miles. Population there grew from about 250,332 in 1994 to 263,633 in 2000, making it among the bay's fastest growing watersheds in terms of population. Gloucester, Yorktown, West Point and Ashland are among the largest urban areas in the watershed.

The York's headwaters are in Orange and Louisa counties, and the river empties into the bay at Yorktown. The historic York River is approximately 36 miles long and its watershed comprises about 6 percent of Virginia.

Natural resource agency staff will work with stakeholders in each basin seeking common agreement on what needs to be done and the best ways to do it.

Land use is predominantly rural. About 70 percent of the watershed is forested, 20 percent is agricultural (crops, pasture and operations that generate animal waste) and 10 percent is urban.

Major Pollutants

Major pollutants in the York basin are nutrients (nitrogen and phosphorus) discharged from municipal wastewater treatment plants or private industrial facilities, and nutrients and sediment from agricultural and urban lands. Some areas of the watershed are experiencing fecal coliform pollution from poorly operating septic systems and other sources.

Methods of Controlling Pollution

Nutrient management plans continue to be developed and implemented that incorporate agricultural best management practices (BMPs) to help reduce runoff from agricultural land into local waterways. Farm plans are also being implemented to help reduce sediment runoff. The inspection of septic drain fields and pumping septic tanks ensure the efficiency and effectiveness of filtering household effluent. Stormwater practices are encouraged in urban and residential areas throughout the basin to further reduce nutrient and sediment loading into the York River and its surrounding tributaries. In the lower reach of the basin, rip-rap and other devices are being installed to reduce shoreline erosion. Finally, a new streambank assessment program has been initiated by the Virginia Department of Conservation and Recreation to advise communities and individual landowners on how best to control streambank erosion.

Watershed Management Planning

Two major watershed management planning efforts are underway in the York River watershed. The first is a public review of the *Lake Anna Watershed Management Plan*, originally called the *Lake Anna Special Area Plan*. This plan was developed by the Lake Anna Advisory Committee between 1994 and 2000. The plan addresses

water quality concerns and maintainance of the rural nature of the watershed environment. The Lake Anna watershed lies within hydrologic units (sub-watersheds) F06, F07, and F08, and covers parts of Louisa, Orange and Spotsylvania Counties. Plan review is led by the Lake Anna Watershed Roundtable comprised of representatives of the Culpeper, Thomas Jefferson and Tri-County/City SWCDs, Rappahannock Area and Thomas Jefferson PDCs, Farm Bureau, Department of Conservation and Recreation (DCR), Department of Environmental Quality (DEQ), Department of Game and Inland Fisheries (DGIF), Department of Mines, Mineral, and Energy, and the Louisa, Orange and Spotsylvania County Planning Departments.

The second watershed management planning effort is development of the *Dragon Run Special Area Management Plan* by the Dragon Run Steering Committee. The Dragon Run watershed lies within hydrologic unit C02 and covers parts of Essex, Gloucester, King and Queen, and Middlesex counties. The Dragon Run Steering Committee consists of one board of supervisors member and two landowners from each of four counties: Essex, Gloucester, King and Queen, and Middlesex.

Previous Tributary Strategy Work

The original *York River and Lower York Coastal Basins Tributary Nutrient Reduction Strategy* was published in February 2000 after many years of collaborative work by stakeholders within the watershed. The primary purpose of the original strategy was to restore habitat conditions, particularly dissolved oxygen and underwater vegetation, in order to support living resources in the York River, its tributaries and the lower York coastal basins. The 2000 strategy observed that high levels of nutrients (nitrogen and phosphorus) and sediments seriously impaired the capacity of the York River and its tributaries to support living resources. About 80 percent of the nutrients emptying into the York come from nonpoint sources, including surface runoff from farms, residential lands and other urban areas, with the remaining 20 percent coming from point sources, such as wastewater treatment and industrial plants. A suite of point and nonpoint management measures was recommended to reduce the harmful nutrient and sediment loadings. If fully implemented these recommended measures would achieve reductions of 2.3 million pounds of nitrogen, 60,000 pounds of phosphorus and 9,000 tons of sediment by the year 2010. The cost to implement the measures was estimated at just over $45 million over 10 years.

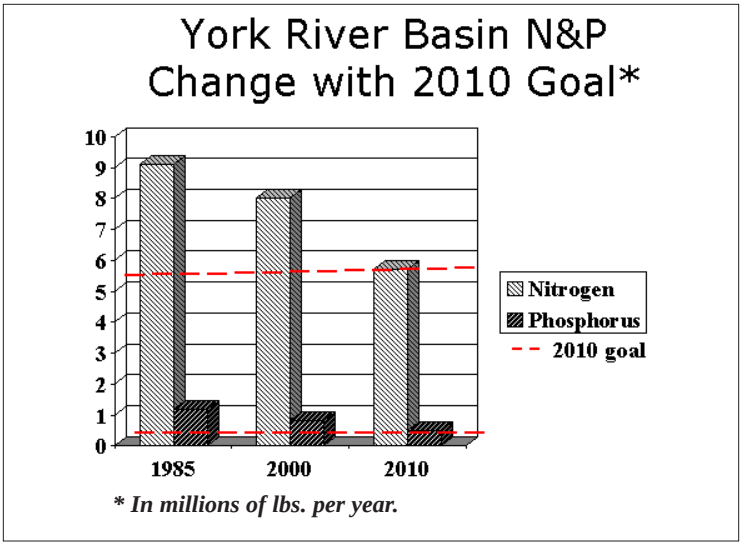
New Load Allocations for York Watershed

The new cap allocation for total nitrogen in the York River is 5.7 millions pounds per year, compared with an actual load of 8.0 million pounds in 2000. The new cap allocation for phosphorus is 480,000 pounds, compared with an actual load of 790,000 pounds in 2000. The new cap allocation for sediment in the upper York basin is 90,000 tons per year, compared with 130,000 tons in 2000. This sediment allocation does not include loading from shoreline erosion (see chart below).

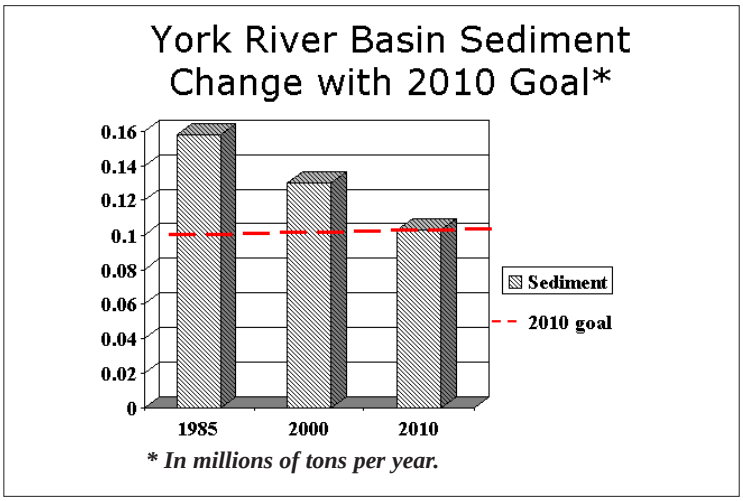
The above charts show the change in total nitrogen, phosphorus and sediment in the York watershed between the original baseline year, 1985, and the newly

York Watershed: C2K total nitrogen, phosphorus and sediment cap load allocations (includes point and nonpoint source pollution).

Year	Tot. N (million lbs/yr)	Tot. P (million lbs/yr)	Sediment (million tons/yr)
1985	9.10	1.18	0.158
2000	8.00	0.79	0.130
CAP	5.70	0.48	0.103
% CHG 85-00	-12%	-33%	-18%
% CHG 00-CAP	-29%	-39%	-21%



** In millions of lbs. per year.*



** In millions of tons per year.*

established baseline year of 2000. The accomplishments within that 15-year period are displayed as a percent change for each pollutant. The cap loads, which were set by the Chesapeake Bay Program, have been determined for each pollutant and are also listed above. The newly revised tributary strategy will devise a plan on how to meet and maintain the updated, reduced loads.

What lies ahead

Between now and April 2004, the state will redouble its efforts in revising the York tributary strategy. The state will work with a diverse group of stakeholders representing local governments, agricultural and development communities, soil and water conservation districts, wastewater treatment operators, planning district commissions, conservation groups and others to develop a strategy unique to the York River watershed. The strategy is meant to meet the assigned nutrient and sediment reduction goals.

This new strategy will provide a menu of reduction actions that focus on varied pollution sources and land uses. As in past strategies agricultural practices and wastewater treatment plant improvements will be important. It is also anticipated that these strategies will focus more on urban and suburban stormwater management, changing land uses, low-impact development and public education than did previous strategies.

The strategy will examine reductions that can be achieved locally with existing resources. It will explore what might be achieved locally with additional resources and what could be accomplished through broader statewide initiatives.

The strategy will outline a phased approach to implementation and to capping nutrient and sediment loads once the reduction goals are reached. It will also look at the future need to track nutrient and sediment loads and allocations as this reduction strategy becomes a cap strategy.

You are encouraged to become involved in this important process. For more information on the development of the new York River tributary strategy or on other water quality initiatives in the York River watershed, contact Matt Criblez, regional manager, Virginia Department of Conservation and Recreation, at (804) 443-8246 or *mdcriblez@dcr.state.va.us*.